

Remarks

In the office action, claims 16, 18, 19, and 22 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 2,432,761 to Hoern ("Hoern"), claims 16, 18-20, and 22 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 1,714,690 to Nevins ("Nevins"), and claims 16, 21 and 22 under 35 U.S.C. §102(b) as being anticipated by JP62-104645 ("JP '645"). In addition, claim 17 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nevins in view of DE 39 35 496 ("DE '496"). Claims 10-15 have been rejected as being unpatentable over U.S. Patent No. 2,439,240 to Cummings ("Cummings"), or DE 27 27 006 ("DE '006") in view of Hoern.

In this response, claims 10-15, 20, and 21 have been amended cancelled. In addition, claim 16 has been amended and new claims 23-29 have been added. Claims 16-19 and 22-27 remain pending in this application.

Applicants respectfully request reconsideration and withdrawal of the rejections in view of the amendments and the following remarks.

A. Claim Amendments:

Claims 10-15, 20, and 21 have been cancelled without prejudice.

Applicants have amended claim 16 to include the features from claim 20 and further to specify that the edge of the valve disk cover blank joining area is an outer circumferential edge. Support for the amendments to claim 1 are found in the original specification, for example at paragraph [0026] and Figure 2b.

Independent claim 16 was rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Hoern, Nevins, and JP '645. Applicants respectfully submit that, because independent claim 16 now includes all of the features from claim 20, that the rejections based on Hoern and JP '645 be withdrawn. Accordingly, only the rejection based on Nevins is discussed below.

Nevins describes a method of manufacturing valves by electric welding. The interior of the head of the valve body includes an upstanding ridge 18 surrounded by annular groove 20. Cap 14 includes an annular ridge 24 that mates with upstanding ridge 18. Welding is effected by bringing the cap 14 in contact with the ridge 18 and passing electric current through the contacting surfaces.

Independent claim 16, as amended, recites a method for making a lightweight valve that includes the steps of:

- providing a valve body blank including a valve stem and a partially hollow valve cone;
- providing a valve disk cover blank; and
- welding the valve body blank to the valve disk cover blank using compression connection welding;
- wherein the partially hollow valve cone includes an interior space and a partially conically shaped wall and the valve disk cover blank has a joining area having an outer circumferential edge, and wherein the welding includes welding the outer circumferential edge to the partially conically shaped wall.

Applicants respectfully submit that Nevins does not describe at least the feature of a cover blank having a joining area that includes an outer circumferential edge as recited in amended claim 16. On the contrary, Nevins teaches that the cap 14 has an annular ridge 24 as a joining region that is substantially the form and size of upstanding ridge 18, purposefully disposed substantially at a distance from the outer circumference of the cap 14 to prevent warping in the valve seat areas. See line 30-line 82.

Furthermore, Applicants submit that Nevins also fails to describe a partially hollow valve cone that includes a partially conically shaped wall wherein the welding includes welding the edge of the cover blank to the partially conically shaped wall. The Examiner points to "a very small truncated cone shaped boundary area at 21". However, The welding does not take place at that region. Instead, Nevins describes that 21 represents the outer wall of groove 20 which is beveled inwardly "in order to provide a space into which some of the fused metal may flow." See line 73-77. In Nevins, welding takes place at the ridge 18 and not at the outer wall of the groove 20.

Moreover, Nevins specifically describes the welding process as an electric welding process, which differs from "compression connection welding" recited in claim 16 and defined in the specification beginning at paragraph [0008].

Applicants respectfully request withdrawal of the rejection to claims 16, 18-20 and 22 under 35 U.S.C. §102(b) as being anticipated by Nevins ("Nevins"). Applicants respectfully submit that all rejections to claims 16-19 and 22 have been overcome by the amendments to claim 16.

B. New claims 23-27:

Applicants have added new claims 23-27.

New independent claim 23 includes the features of the previous version of claim 16 and the features of claim 21 and further specifies that the welding includes contacting the boundary area of the cover blank to the linear edge of the valve body blank so as to form a ring-shaped linear contact area between the cover blank and the valve body blank. Support for new independent claim 23 is provided in the original specification, for example, at paragraph [0029] and Fig. 3.

Because new claim 23 includes all of the features of previous claims 16 and 21, the only outstanding rejection that would apply to new claim 23 is the rejection to claim 21 under 35 U.S.C. §102(b) as being anticipated by JP '645.

JP '645 describes hollow valve whose head part and cover have been brought to pressure welding by hot forging, by pressing the cover into the head into part of the valve body in which a hollow hole part has been formed and, thereafter, heating the head.

New independent claim 23 recites a method for making a lightweight valve wherein,

the valve disk cover blank includes a partially truncated cone-shaped boundary area and the valve body blank includes an interior space delimited by a linear edge, and wherein the welding includes contacting the boundary area to the linear edge so as to form a ring-shaped linear contact area between the cover blank and the valve body blank.

Applicants respectfully submit that JP '645 does not describe at least the features of a valve body blank having a linear edge, and wherein the welding includes contacting the boundary area to the linear edge so as to form a ring-shaped contact area between the cover blank and the body blank.

The Examiner asserts that JP '645 describes in Fig. 3, a cover 06 with a partially truncated cone section. As best understood by Applicants, element 06 in Fig. 3 does not represent a cover blank. Furthermore, the valve body 05 does not have a linear edge in the joining region, but instead appears to have a truncated cone shaped region that mates with the truncated cone shaped region of element 06. Thus, the contact area between the body 05 and element 06 is not a linear contact area, but instead is a rectangular area defined by the two mating conical areas of the body 05 and the element 06.

Allowance of new claims 23 to 27 is therefore respectfully requested.

C. New claims 28 and 29:

New claims 28 and 29 depend from independent claims 16 and 23 respectively and recite the further feature of a support structure extending from the valve stem through the partially hollow valve cone. Support for this feature is found, for example, at paragraph [0024] and in the drawings (reference numbers 8 and 9).

Allowance of new claim 28 and 29 is respectfully requested.


CONCLUSION

In view of the amendments made and arguments presented, Applicants respectfully submit that the presently pending claims are in condition for allowance.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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